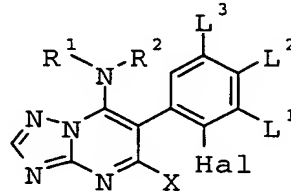


## Claims

1. Substituted 6-(2-halogenphenyl)-triazolopyrimidines of formula I



I

in which

Hal is halogen;

L<sup>1</sup>, L<sup>3</sup> independently denote hydrogen, halogen, or C<sub>1</sub>-C<sub>4</sub>-alkyl;

L<sup>2</sup> is hydrogen, halogen, C<sub>1</sub>-C<sub>4</sub>-haloalkyl, or NH<sub>2</sub>, NHR<sup>b</sup>, or N(R<sup>b</sup>)<sub>2</sub>,

R<sup>b</sup> is C<sub>1</sub>-C<sub>8</sub>-alkyl, C<sub>3</sub>-C<sub>10</sub>-alkenyl, C<sub>3</sub>-C<sub>10</sub>-alkynyl, C<sub>1</sub>-C<sub>6</sub>-haloalkyl, C<sub>3</sub>-C<sub>6</sub>-haloalkenyl, C<sub>3</sub>-C<sub>6</sub>-haloalkynyl, C<sub>1</sub>-C<sub>8</sub>-alkoxy-C<sub>1</sub>-C<sub>8</sub>-alkyl, C<sub>1</sub>-C<sub>8</sub>-alkylthio-C<sub>1</sub>-C<sub>8</sub>-alkyl, C<sub>3</sub>-C<sub>10</sub>-cycloalkyl, or C(=O)-A, in which

A is hydrogen, hydroxy, C<sub>1</sub>-C<sub>8</sub>-alkyl, C<sub>1</sub>-C<sub>8</sub>-alkoxy, C<sub>1</sub>-C<sub>6</sub>-halogenalkoxy, C<sub>1</sub>-C<sub>8</sub>-alkylamino or di-(C<sub>1</sub>-C<sub>8</sub>-alkyl)amino;

wherein at least one from L<sup>1</sup>, L<sup>2</sup>, and L<sup>3</sup> is not hydrogen;

X is halogen, cyano, C<sub>1</sub>-C<sub>6</sub>-alkyl, C<sub>1</sub>-C<sub>6</sub>-alkoxy, C<sub>1</sub>-C<sub>6</sub>-haloalkoxy or C<sub>3</sub>-C<sub>8</sub>-alkenyloxy.

R<sup>1</sup> denote C<sub>1</sub>-C<sub>10</sub>-alkyl, C<sub>2</sub>-C<sub>10</sub>-alkenyl, C<sub>2</sub>-C<sub>10</sub>-alkynyl, or C<sub>4</sub>-C<sub>10</sub>-alkadienyl, C<sub>2</sub>-C<sub>10</sub>-haloalkenyl

wherein R<sup>1</sup> may be unsubstituted or may carry one to three groups R<sup>a</sup>,

R<sup>a</sup> is cyano, nitro, hydroxyl, C<sub>1</sub>-C<sub>6</sub>-alkyl, C<sub>3</sub>-C<sub>6</sub>-cycloalkyl, C<sub>1</sub>-C<sub>6</sub>-alkoxy, C<sub>1</sub>-C<sub>6</sub>-alkylthio, C<sub>1</sub>-C<sub>6</sub>-alkylamino, di-C<sub>1</sub>-C<sub>6</sub>-alkylamino, C<sub>2</sub>-C<sub>6</sub>-alkenyl, C<sub>2</sub>-C<sub>6</sub>-alkenyloxy, C<sub>2</sub>-C<sub>6</sub>-alkynyl, C<sub>3</sub>-C<sub>6</sub>-alkynyloxy, or C<sub>1</sub>-C<sub>4</sub>-alkylenedioxy;

R<sup>2</sup> is hydrogen;

2. Compounds of formula I according to claim 1, in which

5 R<sup>1</sup> is straight chained or branched C<sub>2</sub>-C<sub>6</sub>-alkenyl,  
C<sub>1</sub>-C<sub>6</sub>-alkyl.

3. Compounds of formula I according to claim 1 or 2 in which X  
is halogen.

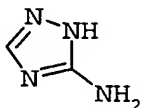
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4. Compounds of formula I according to any one of claims 1 to 3  
in which the 6-(2-halogenphenyl)group represents one of the  
following moieties:

15 2,3,5-trifluorophenyl, 2-F,4-CF<sub>3</sub>-phenyl, 2-F,5-CH<sub>3</sub>-phenyl,  
2-Cl,4-F-phenyl, 2-F,4-Cl-phenyl, 2-F,4-Br-phenyl, 2-Cl,4-Br-  
phenyl, 2,3-difluorophenyl, 2,4-difluorophenyl, 2,4,5-tri-  
fluorophenyl, 2,3,4-trifluorophenyl, 2-F,4-NHC(O)CH<sub>3</sub>-phenyl,  
2-Br,3,5-difluorophenyl, 2-F,4-NO<sub>2</sub>-phenyl, and  
20 2-Cl,4-NO<sub>2</sub>-phenyl.

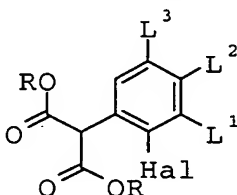
5. A process for the preparation of compounds of formula I as  
defined in claims 3 and 4 which comprises reacting  
5-amino-1,2,4-triazole

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with 2-phenyl-substituted malonic acid ester of formula II,

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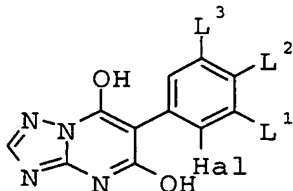


II

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wherein Hal, L<sup>1</sup>, L<sup>2</sup>, and L<sup>3</sup> are as defined in formula I, and R  
denotes C<sub>1</sub>-C<sub>6</sub>-alkyl, under alkaline conditions, to yield com-  
pounds of formula III,

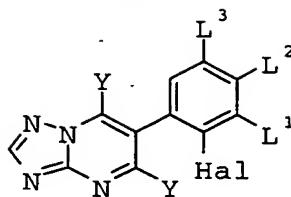
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III

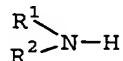
45 which are subsequently treated with a halogenating agent to  
give 5,7-dihalogen-6-phenyl-triazolopyrimidines of formula IV

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IV

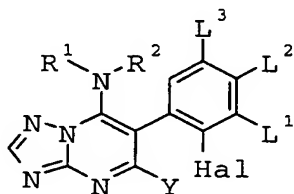
in which Y is halogen, and which is reacted with an amine of formula V



V

in which R<sup>1</sup> and R<sup>2</sup> are as defined in claim 1 to produce compounds of formula I, as defined in claim 1.

6. A process for the preparation of compounds of formula I according to claim 1 wherein X is cyano, C<sub>1</sub>-C<sub>10</sub>-alkoxy, or C<sub>1</sub>-C<sub>6</sub>-haloalkoxy, which comprises reacting 5-halogen-triazolo-pyrimidine of formula I',



I'

wherein Y is halogen, with compounds of formula VI,



VI

- which are, dependent from the value of X' to be introduced, an anorganic cyano salt, an alkoxylate, haloalkoxylate or an alkenyloxylate, resp., wherein M is ammonium-, tetraalkylammonium-, alkalimetal- or earth metal cation, to produce compounds of formula I.
7. Intermediates of formulae II, III, and IV as defined in claim 5, in which the 6-(2-halogenphenyl)group represents one of the following moieties:

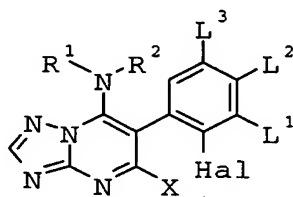
2,3,5-trifluorophenyl, 2-F,4-CF<sub>3</sub>-phenyl, 2-F,5-CH<sub>3</sub>-phenyl, 2-Cl,4-F-phenyl, 2-F,4-Cl-phenyl, 2-F,4-Br-phenyl, 2-Cl,4-Br-phenyl, 2,3-difluorophenyl, 2,4,5-trifluorophenyl, 2,3,4-trifluorophenyl, 2-F,4-NHC(O)CH<sub>3</sub>-phenyl, 2-Br,3,5-difluorophenyl, 2-F,4-NO<sub>2</sub>-phenyl, and 2-Cl,4-NO<sub>2</sub>-phenyl.

8. A composition suitable for controlling phytopathogenic fungi, comprising a solid or liquid carrier and a compound of the formula I as claimed in claim 1.

5 9. A method for controlling phytopathogenic fungi, which comprises treating the fungi or the materials, plants, the soil or the seed to be protected against fungal attack with an effective amount of a compound of the formula I as claimed in claim 1.

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10. Substituted 6-(2-halogenphenyl)-triazolopyrimidines of formula I



I

in which

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Hal is halogen;

$L^1, L^3$  independently denote hydrogen, halogen, or  $C_1$ - $C_4$ -alkyl;

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$L^2$  is hydrogen, halogen,  $C_1$ - $C_4$ -haloalkyl, or  $NH_2$ ,  $NHR^b$ , or  $N(R^b)_2$ ,

$R^b$  is  $C_1$ - $C_8$ -alkyl,  $C_3$ - $C_{10}$ -alkenyl,  $C_3$ - $C_{10}$ -alkynyl,  $C_1$ - $C_6$ -haloalkyl,  $C_3$ - $C_6$ -haloalkenyl,

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$C_3$ - $C_6$ -haloalkynyl,  $C_1$ - $C_8$ -alkoxy- $C_1$ - $C_8$ -alkyl,  $C_1$ - $C_8$ -alkylthio- $C_1$ - $C_8$ -alkyl,  $C_3$ - $C_{10}$ -cycloalkyl, or  $C(=O)$ -A, in which

A is hydrogen, hydroxy,  $C_1$ - $C_8$ -alkyl,  $C_1$ - $C_8$ -alkoxy,  $C_1$ - $C_6$ -halogenalkoxy,  $C_1$ - $C_8$ -alkylamino or

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di- $(C_1$ - $C_8$ -alkyl)amino;

wherein at least one from  $L^1$ ,  $L^2$ , and  $L^3$  is not hydrogen;

X is halogen, cyano,  $C_1$ - $C_6$ -alkyl,  $C_1$ - $C_6$ -alkoxy,  $C_1$ - $C_6$ -haloalkoxy or  $C_3$ - $C_8$ -alkenyloxy.

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$R^1$  and  $R^2$  together with the interjacent nitrogen atom represent a saturated or partially unsaturated 5- or 6-membered heterocycle, containing one to four nitrogen atoms or one to three nitrogen atoms and one sulfur or

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oxygen atom, which ring may be substituted by one to three R<sup>a</sup> radicals;

- 5 R<sup>a</sup> is cyano, nitro, hydroxyl, C<sub>1</sub>-C<sub>6</sub>-alkyl, C<sub>3</sub>-C<sub>6</sub>-cyclo-alkyl, C<sub>1</sub>-C<sub>6</sub>-alkoxy, C<sub>1</sub>-C<sub>6</sub>-alkylthio, C<sub>1</sub>-C<sub>6</sub>-alkylamino, di-C<sub>1</sub>-C<sub>6</sub>-alkylamino, C<sub>2</sub>-C<sub>6</sub>-alkenyl, C<sub>2</sub>-C<sub>6</sub>-alkenyloxy, C<sub>2</sub>-C<sub>6</sub>-alkynyl, C<sub>3</sub>-C<sub>6</sub>-alkynyloxy, or C<sub>1</sub>-C<sub>4</sub>-alkylenedioxy;

- 10 11. Compounds of formula I according to claim 10, in which

- 15 R<sup>1</sup> and R<sup>2</sup> together with the interjacent nitrogen atom represent a heterocyclic ring with 5 or 6 carbon atoms being optionally substituted with one or two C<sub>1</sub>-C<sub>4</sub>-alkyl groups.

- 20 12. Compounds of formula I according to claim 10 or 11 in which R<sup>1</sup> and R<sup>2</sup> together with the interjacent nitrogen atom represent a 5- or 6-membered heterocyclic ring being optionally substituted with one or two methyl groups.

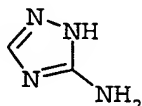
13. Compounds of formula I according to any one of claims 10 to 12 in which X is halogen.

- 25 14. Compounds of formula I according to any one of claims 10 to 13 in which the 6-(2-halogenphenyl)group represents one of the following moieties:

- 30 2,3,5-trifluorophenyl, 2-F,4-CF<sub>3</sub>-phenyl, 2-F,5-CH<sub>3</sub>-phenyl, 2-Cl,4-F-phenyl, 2-F,4-Cl-phenyl, 2-F,4-Br-phenyl, 2-Cl,4-Br-phenyl, 2,3-difluorophenyl, 2,4-difluorophenyl, 2,4,5-trifluorophenyl, 2,3,4-trifluorophenyl, 2-F,4-NHC(O)CH<sub>3</sub>-phenyl, 2-Br,3,5-difluorophenyl, 2-F,4-NO<sub>2</sub>-phenyl, and 2-Cl,4-NO<sub>2</sub>-phenyl.

- 35 15. A process for the preparation of compounds of formula I as defined in claims 13 and 14 which comprises reacting 5-amino-1,2,4-triazole

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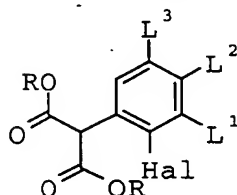


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with 2-phenyl-substituted malonic acid ester of formula II,

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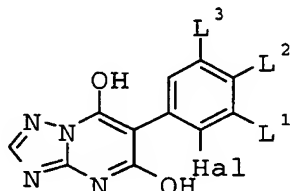


II

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wherein Hal, L¹, L², and L³ are as defined in formula I, and R denotes C₁-C₆-alkyl, under alkaline conditions, to yield compounds of formula III,

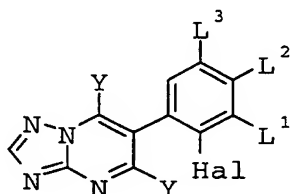
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III

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which are subsequently treated with a halogenating agent to give 5,7-dihalogen-6-phenyl-triazolopyrimidines of formula IV

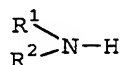


IV

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in which Y is halogen, and which is reacted with an amine of formula V

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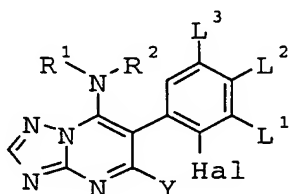
V

in which R¹ and R² are as defined in claim 10 to produce compounds of formula I, as defined in claim 10.

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16. A process for the preparation of compounds of formula I according to claim 10 wherein X is cyano, C₁-C₁₀-alkoxy, or C₁-C₆-haloalkoxy, which comprises reacting 5-halogen-triazolopyrimidine of formula I',

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I'

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wherein Y is halogen, with compounds of formula VI,



VI

which are, dependent from the value of X' to be introduced, an anorganic cyano salt, an alkoxylate, haloalkoxylate or an alkenyloxylate, resp., wherein M is ammonium-, tetraalkylammonium-, alkalimetal- or earth metal cation, to produce compounds of formula I.

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17. A composition suitable for controlling phytopathogenic fungi, comprising a solid or liquid carrier and a compound of the formula I as claimed in claim 10.

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18. A method for controlling phytopathogenic fungi, which comprises treating the fungi or the materials, plants, the soil or the seed to be protected against fungal attack with an effective amount of a compound of the formula I as claimed in claim 10.

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